WHAT IS CLAIMED IS:

1. A method for configuring an aircraft for low sonic boom supersonic flight conditions comprising:

scaling an equivalent area distribution curve of the aircraft to approximate an ideal equivalent area distribution goal curve; and

relaxing a design constraint to require the equivalent area distribution curve of the aircraft to be at or below the equivalent area distribution goal curve.

2. The method according to Claim 1 further comprising:

segmenting a wing of the aircraft into panels;

analyzing the flow characteristics for each panel; and

smoothing the configuration of each panel with adjacent panels along the span and the chord of the wing to smooth the wing surface.

3. The method according to Claim 1 further comprising:

determining design variables at the root and the tip of a wing of the aircraft along Mach angle lines (X - Beta*R).

4. The method according to Claim 1 further comprising:

determining an incidence angle for a wing root of the aircraft for maximum lift-to-drag and connection to a fuselage; and

determining the shape of the remaining portions of the wing for maximum lift-to-drag.

5. The method according to Claim 4 further comprising:

re-determining the incidence angle for the root of a wing of the aircraft and the remaining portion of the wing to meet less than or equal to equivalent area low sonic boom constraints and maximum lift-to-drag.

6. The method according to Claim 1 further comprising:

dividing a flight regime of the aircraft into multiple flight modes;

determining an optimum configuration of non-moving components for one of the flight modes; and

determining an optimum configuration of moving components for the other flight modes based on the configuration of non-moving components.

7. The method according to Claim 1 further comprising:
determining an optimum configuration according to at least one of: lift-to-drag ratio and low sonic boom.

8. The method according to Claim 3 further comprising:
limiting the length of the excursion of the equivalent area distribution curve below the equivalent area distribution goal curve by dividing the excursion into at least two smaller excursions.

9. The method according to Claim 1 further comprising:
determining a minimized sonic boom disturbance of an F-function; and
scaling the equivalent area distribution goal curve to maintain the desired aircraft weight while countering excursions below the equivalent area distribution goal curve.

10. The method according to Claim 3 further comprising:
analyzing the sonic boom disturbance below and to the side of the aircraft; and
perturbing aircraft design variables to meet sonic boom constraints below and to the side of the aircraft.

11. The method according to Claim 1 further comprising:
adjusting the configuration of a wing on the aircraft to redistribute areas of lift on the wing; and
reshaping a fuselage of the aircraft in combination with the wing to match the equivalent area distribution goal curve.

12. The method according to Claim 11 further comprising:
redistributing the areas of lift subject to center-of-pressure constraints to achieve desired balance characteristics for the aircraft.

13. An aircraft comprising:

a fuselage;

a wing integrated with the fuselage, wherein the aircraft is configured to meet an equivalent area distribution goal that minimizes sonic boom disturbance by redistributing areas of lift of the wing, wherein the equivalent area distribution of the aircraft is configured to be less than or equal to the equivalent area distribution goal.

14. The aircraft according to Claim 13 further comprising:

a plurality of control surfaces; and

a control system configured to trim the control surfaces to meet sonic boom constraints during different flight modes.

15. An aircraft design system comprising:

logic instructions operable to:

redistribute lift of a wing by configuring the wing with areas of far-field expansion ahead of areas of far-field compression; and

scale an equivalent area distribution goal curve to maintain the desired aircraft weight while countering excursions below the equivalent area distribution goal curve.

16. The system according to Claim 15 further comprising:

logic instructions operable to:

segment the wing into panels;

analyze the flow characteristics for each panel; and

interpolate the configuration of each panel with adjacent panels to smooth oscillations in the wing surface chordwise, and spanwise along Mach angle lines.

17. The system according to Claim 15 further comprising:

logic instructions operable to:

analyze perturbations of design variables at the root and the tip of the wing along Mach angle lines.

18. The system according to Claim 15 further comprising:

logic instructions operable to:

analyze perturbations of design variables along a mid-section portion of the wing.

19. The system according to Claim 15 further comprising:

logic instructions operable to:

determine an incidence angle for the wing for maximum lift-to-drag; and

determine the shape of the remaining portions of the wing for maximum lift-to-drag; and

re-determine the incidence angle and shape of the wing to also meet low sonic boom constraints.

20. The system according to Claim 15 further comprising:

logic instructions operable to:

redistribute the lift of the wing with center-of-pressure constraints for aircraft balance.

21. The system according to Claim 15 further comprising:

logic instructions operable to:

divide a flight regime of the aircraft into multiple flight modes;

determine an optimum configuration according to sonic boom constraints at a flight condition; and

determine another optimum configuration to minimize drag at another flight condition subject to sonic boom constraints.

22. The system according to Claim 15 further comprising:

logic instructions operable to:

divide the areas of far-field expansion and far-field compression into at least two areas of expansion and compression to reduce the magnitude of the sonic boom disturbance.

23. The system according to Claim 15 further comprising:

logic instructions operable to:

determine a desired magnitude of sonic boom disturbance on an F-function; and

scale the equivalent area distribution goal curve to maintain the desired aircraft weight while countering excursions below the equivalent area distribution goal to achieve the desired magnitude of sonic boom disturbance.

24. The system according to Claim 15 further comprising:

logic instructions operable to:

analyze the sonic boom disturbance below and to the side of the aircraft; and

configure the aircraft to meet sonic boom constraints below and to the side of the aircraft.

25. The system according to Claim 15 further comprising:

logic instructions operable to:

allow the user to define a design variable with limits that allow variation in the incidence angle of the wing where the wing joins the aircraft within a range that allows the wing to be connected to the aircraft.

26. An apparatus comprising:

an equivalent area distribution that includes one or more excursions below an equivalent area distribution goal, wherein the equivalent area distribution minimizes shock wave disturbance, and the lift forces on the apparatus are distributed with an area of far-field expansion followed by an area of far-field compression that causes the excursion of the equivalent area distribution to return approximately to the equivalent area distribution goal.

27. The apparatus according to Claim 26 further comprising:

a plurality of areas of expanded flow and a plurality of areas of compressed airflow, wherein each area of compressed flow balances at least one of the areas of expanded flow.

28. The apparatus according to Claim 26 further comprising:

a plurality of control surfaces; and

a control system configured to trim the control surfaces to meet performance goals and shock wave disturbance constraints during different operational modes.